48) ELECTRICAL STIMULATION OF THE NUCLEUS LOCUS COERULEUS ACTIVATING THE SYMPATHETIC NERVOUS SYSTEM IN CONSCIOUS SPONTANEOUSLY HYPERTENSIVE RAT.

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Previously, we demonstrated the hyporesponsiveness of locus coeruleus (LC) in spontaneously hypertensive rats (SHR) to electrical stimulation (Brain research 140 : 137-147, 1978). However, this study has been done under anesthesia. Therefore, we studied the responsiveness of LC in fully conscious SHR to electrical stimulation.

Female SHR and age-sex matched Wistar-Kyoto rat (WKY) (20-24 weeks old) were used in this study. Each rat was anesthetized with alpha-chloralose and urethane. LC was investigated stereotactically, and pressor responses to electrical stimulation of LC were determined. After 48 hours, we stimulated LC electrically. The pressor response in fully conscious rats was determined. During a rest period and during LC stimulation period, the level of plasma catecholamine (CA) concentration were measured by high performance liquid chromatography with electrochemical detection method (HPLC-ECD). Pressor response in both conscious strains was determined after intravenous administration of norepinephrine and phenylephrine.

Results

1. MAP in SHR(n=17) was higher than that in WKY(n=12) in conscious state (146 ± 7 vs 104 ± 2 mmHg $p < 0.001$).
2. There were no differences of pressor responses with norepinephrine and phenylephrine between the two strains.
3. Electrical stimulation of LC produced smaller elevation of MAP in SHR, compared to WKY (15 ± 4 vs 26 ± 3 mmHg $p < 0.05$).
4. Resting level of plasma CA concentration was not different between the two conscious strains [WKY : norepinephrine (NE) 462 ± 40 pg/ml, epinephrine (E) 519 ± 60 pg/ml vs SHR : NE 627 ± 110 pg/ml, E 410 ± 60 pg/ml n.s.].
5. Following LC stimulation (20Hz, $100 \mu A$), plasma NE increased more in WKY than in SHR (ΔNE : 436 ± 60 vs 202 ± 37 pg/ml, $p < 0.01$). However, plasma E was not different between the two strains (ΔE : WKY 416 ± 90 pg/ml vs SHR 393 ± 100 pg/ml n.s.).

Our data demonstrated that the electrical stimulation of LC in conscious SHR was less responsive than WKY, suggesting that the LC in SHR provided smaller activation of sympatho-adrenal system.